

SURGICAL APPROACH OF THOREX AND TRP

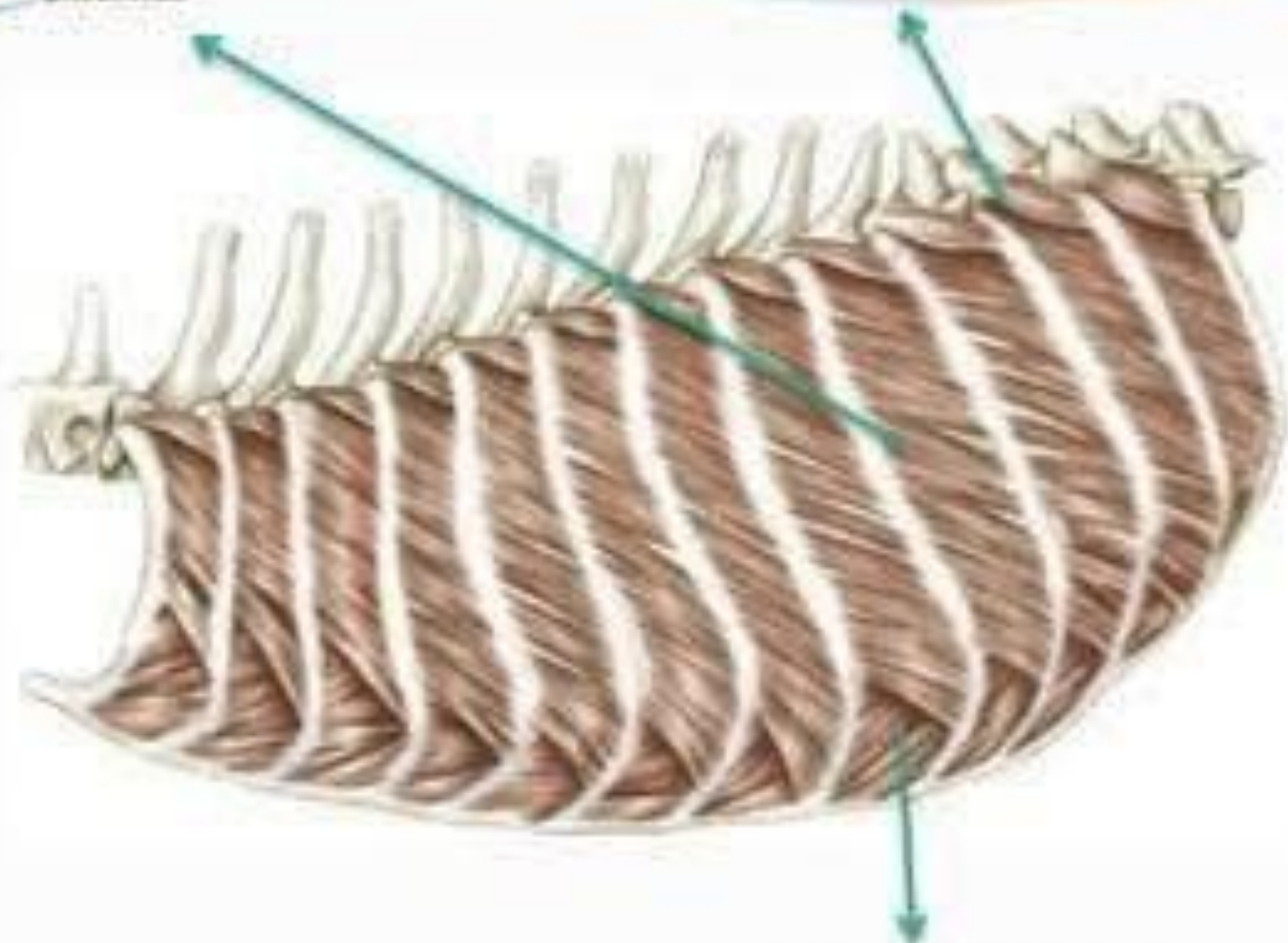
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SURGICAL APPROACHES

- ✓ Intercostal Thoracotomy
- ✓ Rib Resection Thoracotomy
- ✓ Median Sternotomy
- ✓ Transsternal Thoracotomy

Intercostalis
externus

Levator costae



Intercostalis internus



Purpose of Thoracic Surgery

- Diagnose by endoscopic or open biopsy
- Treat disease by resection or repair of tissue
- Correct structural deformity
- Traumatic injury repair

Thoracotomy

- surgical incision of the chest wall.

Types of thoracic incisions

- Sternotomy
- Thoracotomy
- Axillary thoracotomy
- Anterior mediastinotomy
- Thoracoabdominal incision

INTRODUCTION

- Incision;- Is a surgical wound made by a surgeon on the skin, with intension of gaining access to a lesion beneath or cavity.
- Such wounds created anywhere on the chest (thoracic) wall is thoracic incision

Surgical Approaches & Affections of Thorax

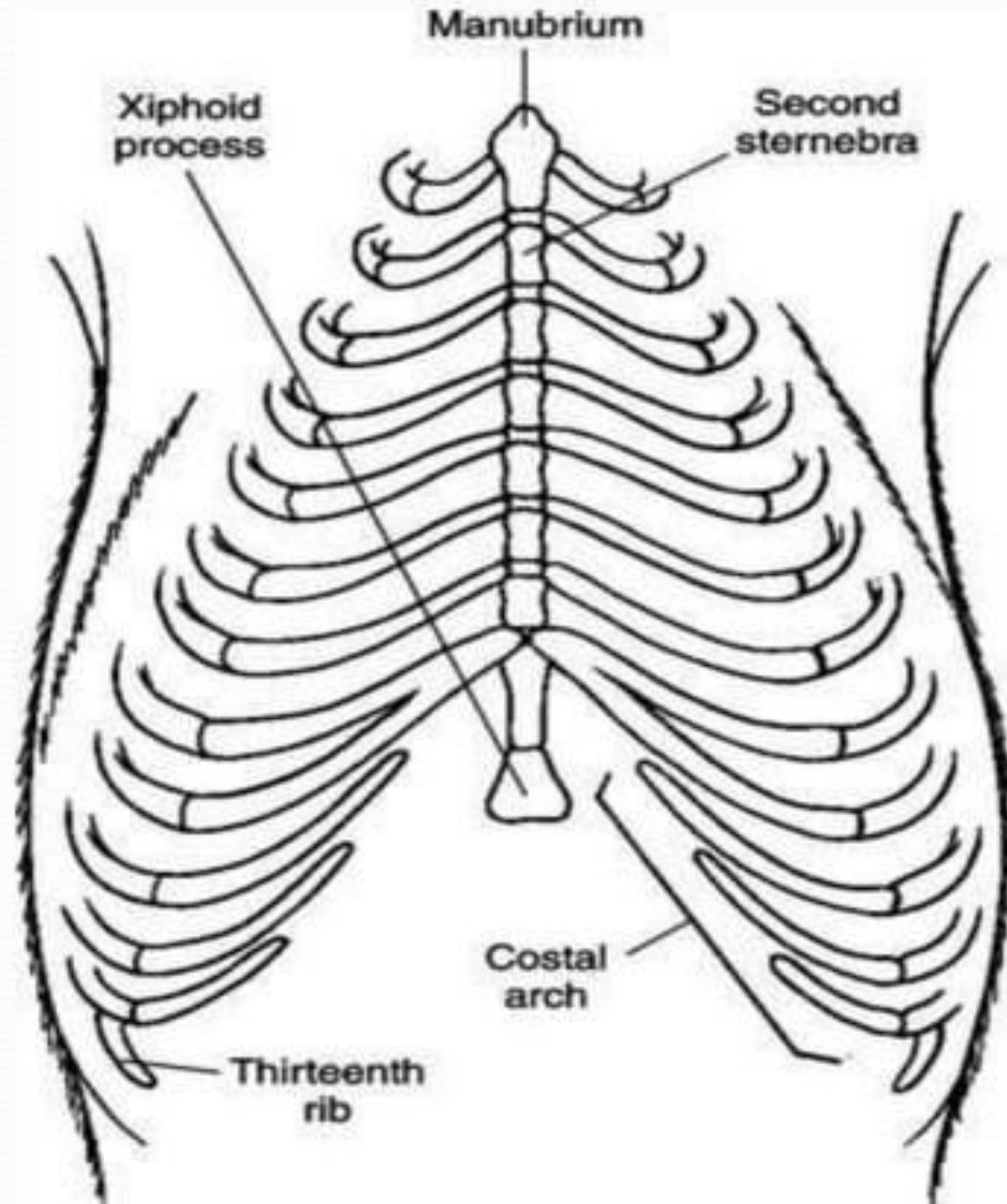
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Thoracotomy

- surgical incision of the chest wall.

SURGICAL ANATOMY



Serratus dorsalis cranialis

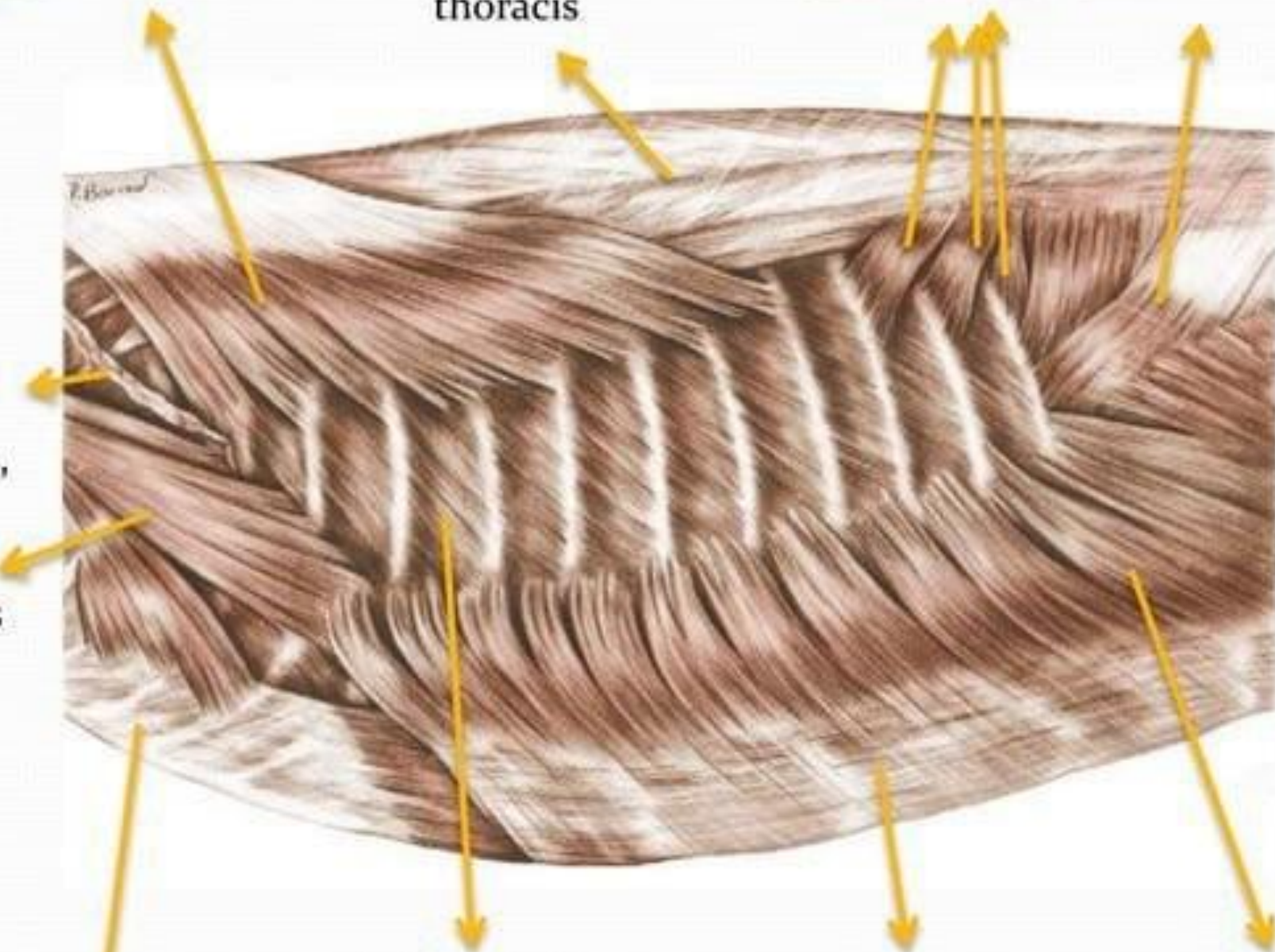
Longissimus caudalis thoracis

Serratus dorsalis

Obliquus internus abdominis

Serratus ventralis,

Scalenus dorsalis



Rectus thoracis

Intercostalis externus

Rectus abdominis

Obliquus externus abdominis



m. semispinalis thoracis

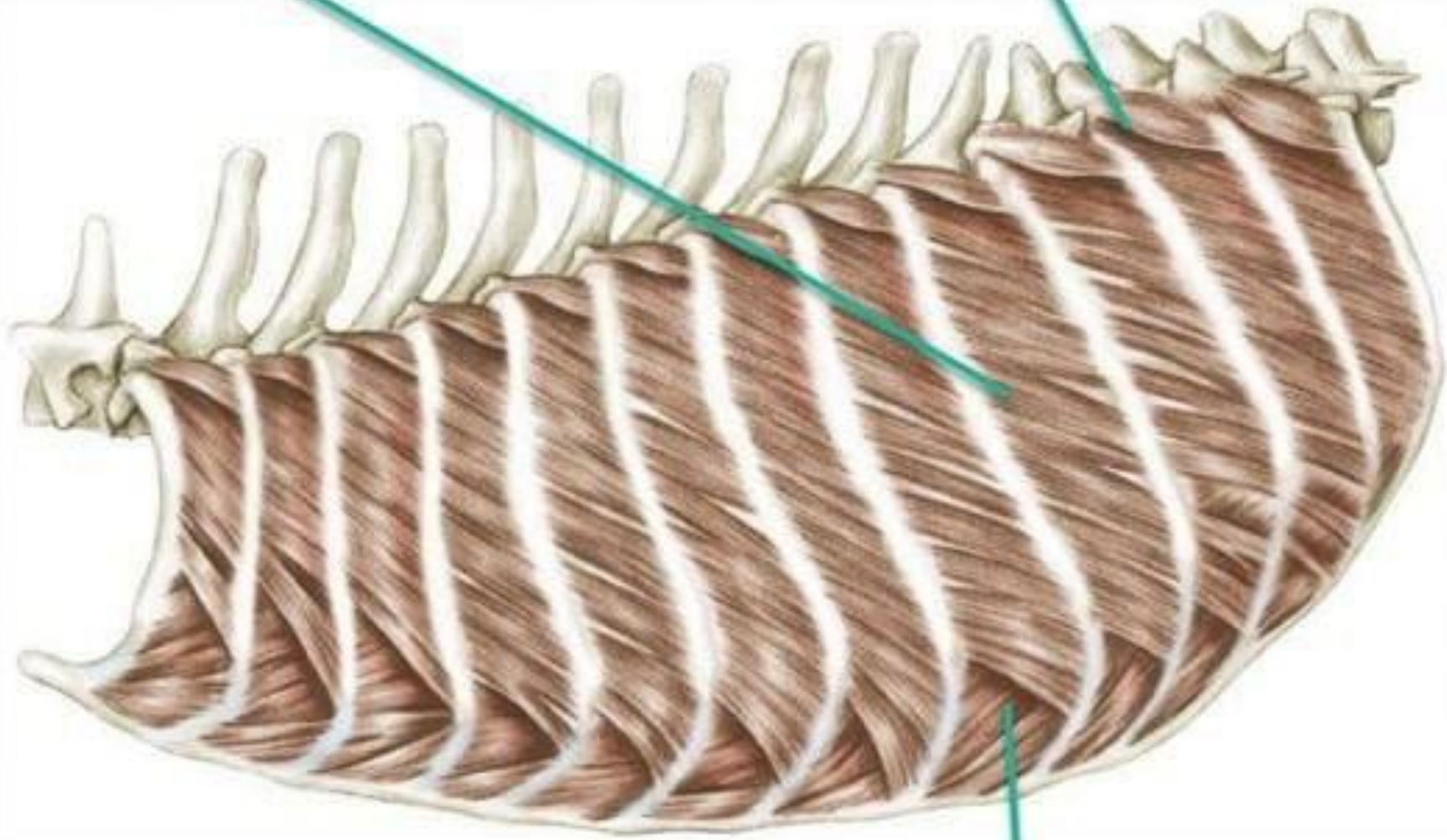
mm. intercostales externi

m. longissimus thoracis

nn. thoracici rr. dorsales rr. cutanei laterales

Intercostalis
externus

Levator costae

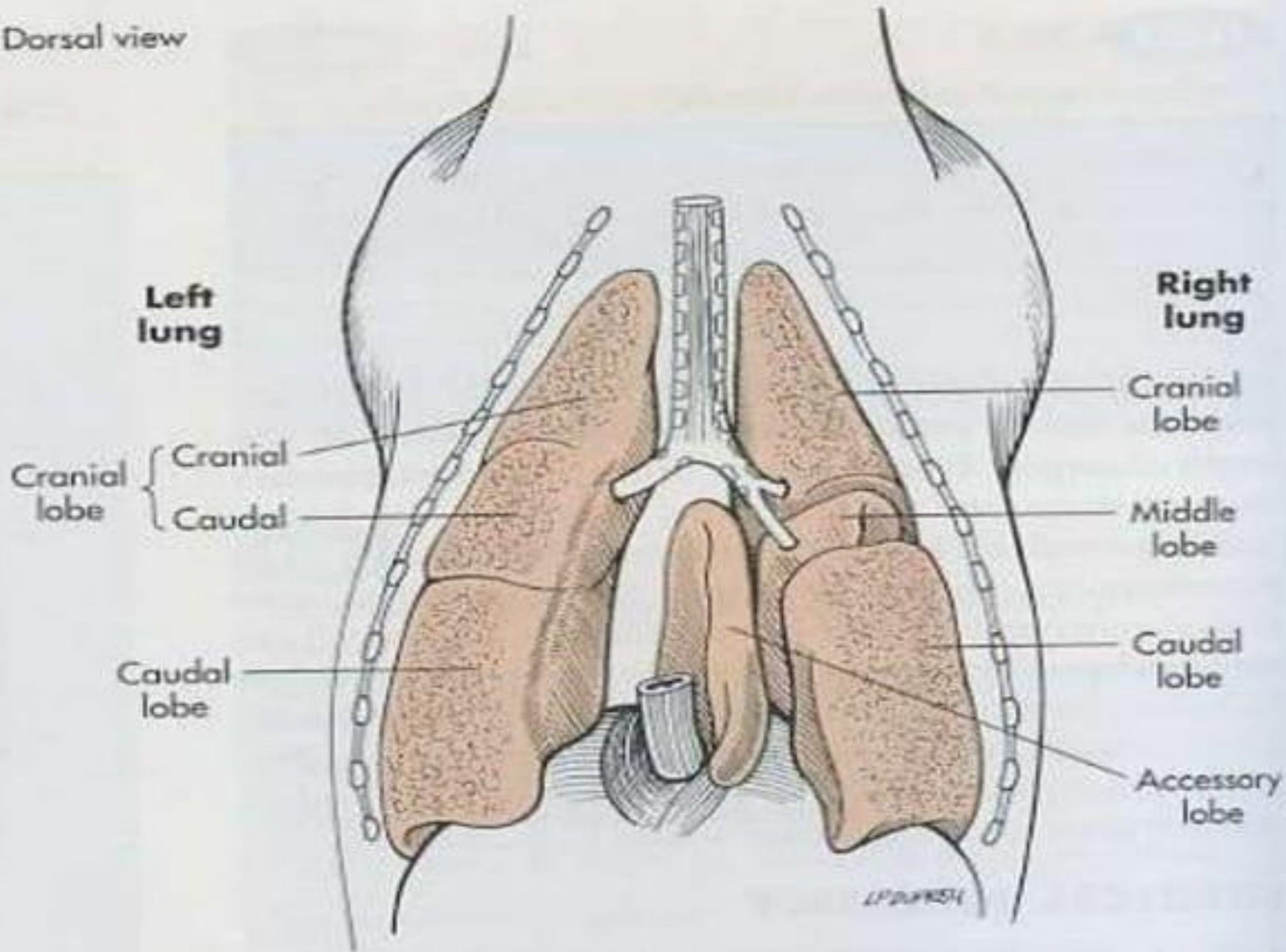


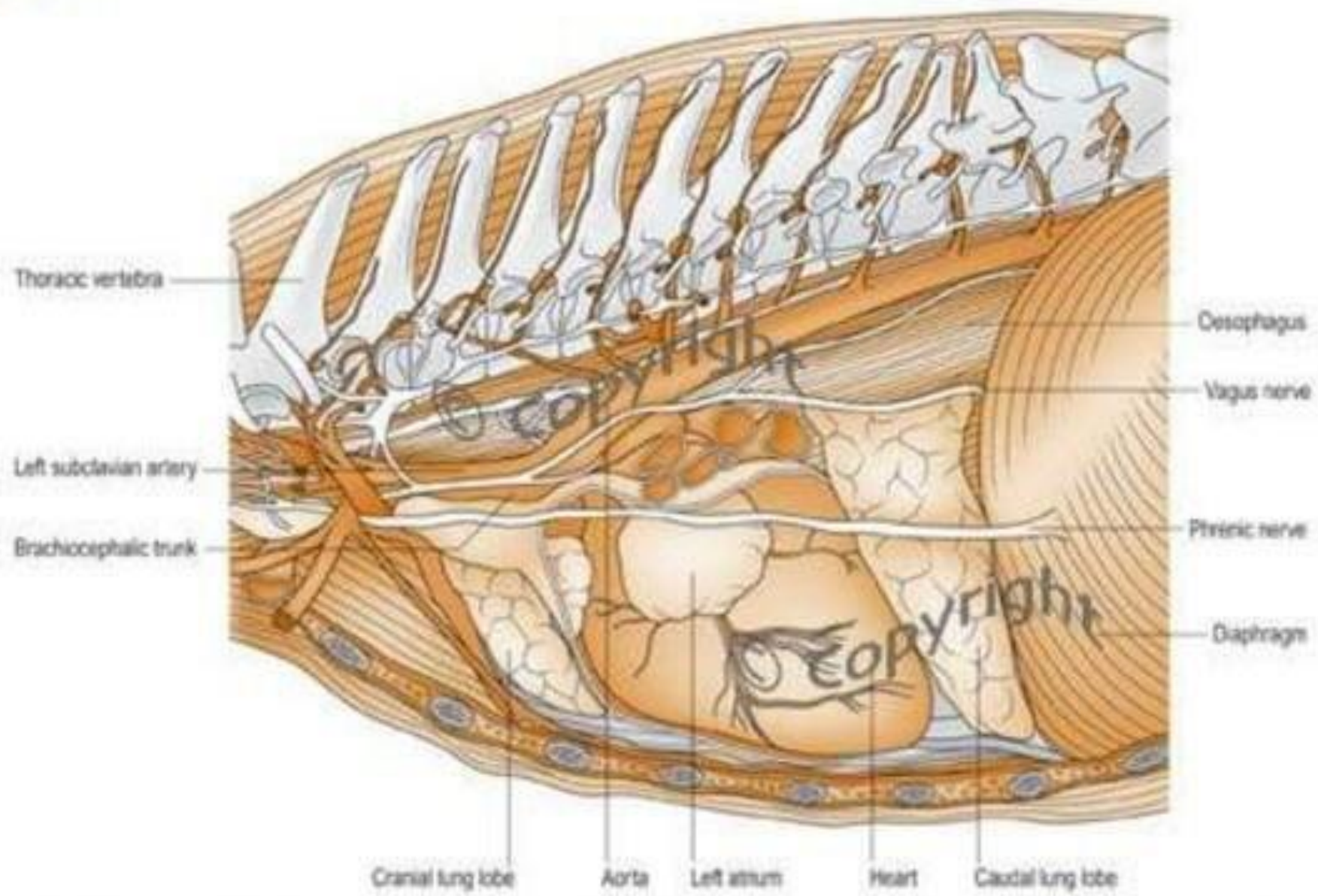
Intercostalis internus

Fig. 5.14 Ribcage (2)
internal intercostal
muscles: left lateral view.
The rectus abdominis muscle is fully reflected following the severance of its fleshy attachment (see Fig. 5.13). Exposed by this procedure are the costal arch, the continuation of the rectus sheath and the cranial epigastric vessels. The external intercostal muscles have also been removed from all of the intercostal and caudal interchondral spaces exposing the internal intercostal muscles.

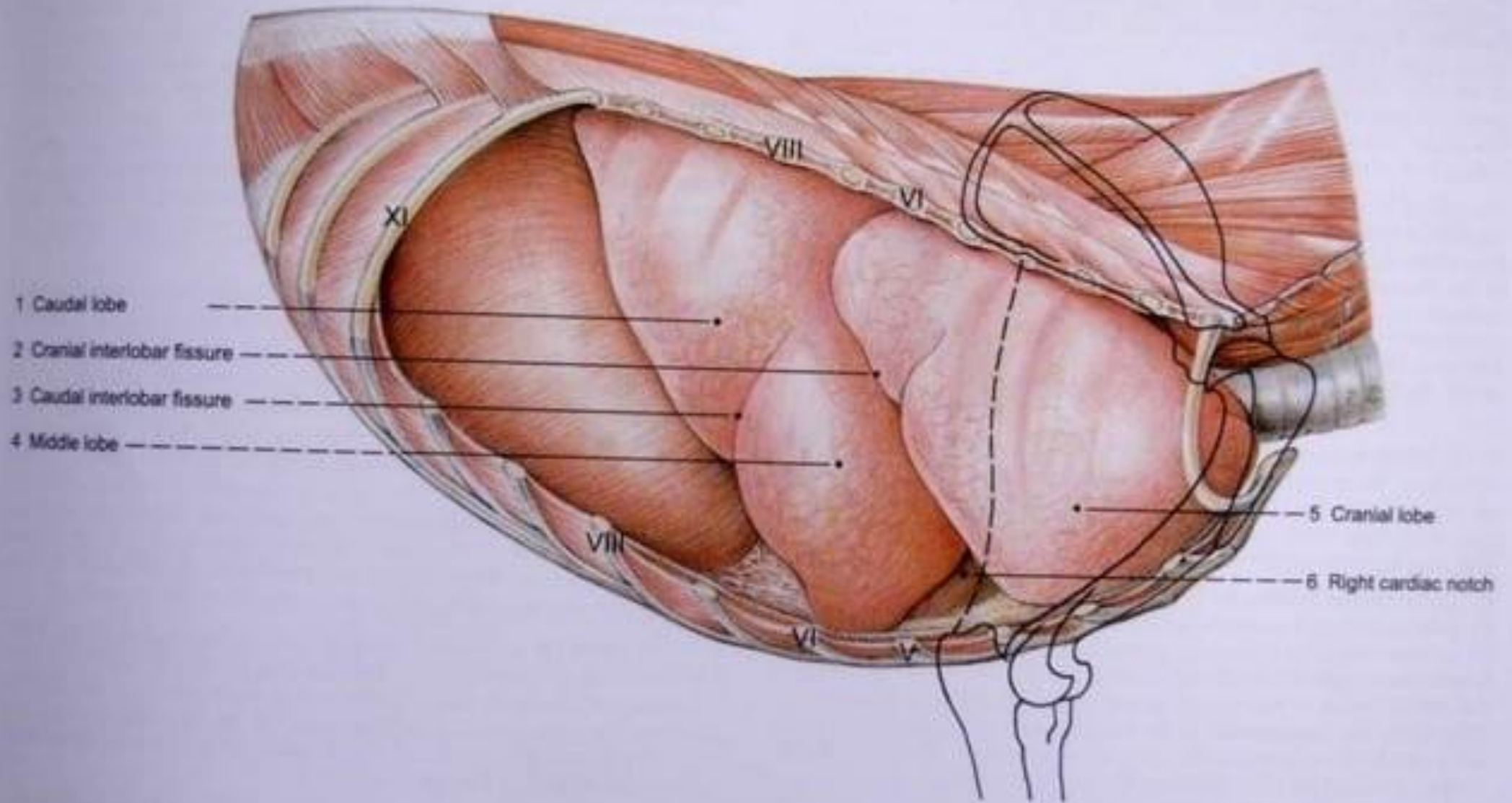


Dorsal view





(right lung)



SURGICAL APPROACHES

- ✓ Intercostal Thoracotomy
- ✓ Rib Resection Thoracotomy
- ✓ Median Sternotomy
- ✓ Transsternal Thoracotomy

Special Considerations:

- In animals with respiratory dysfunction, oxygen may be administered.
- All animals with open chest cavities require intermittent positive pressure ventilation (including those with diaphragmatic hernias).
- High ventilatory pressures should be avoided in patients with chronically collapsed lung lobes, pneumonia.
- Thoracotomy procedures often cause substantial pain, and postoperative analgesic therapy is indicated.

Intercostal Thoracotomy

- Standard approach
- Excellent access to immediate structures
- Complications – uncommon, if airtight closure
- 3rd to 10th ICS
- Lateral radiograph

Thoracostomy Tube Placement

Make an incision over the dorsal third of the intercostal space.



Tunnel the tube with trocar - tipped stylet cranioventrally



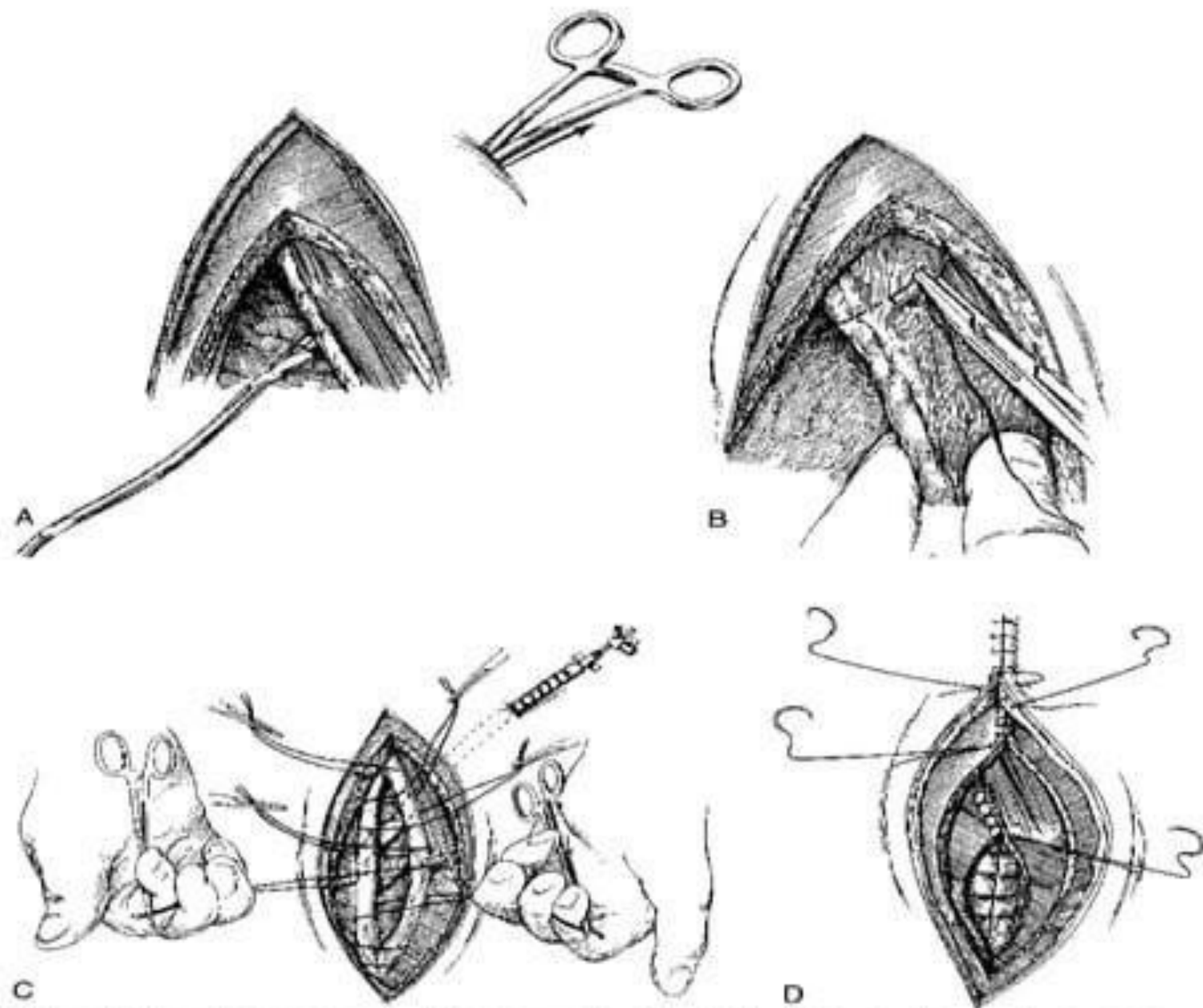
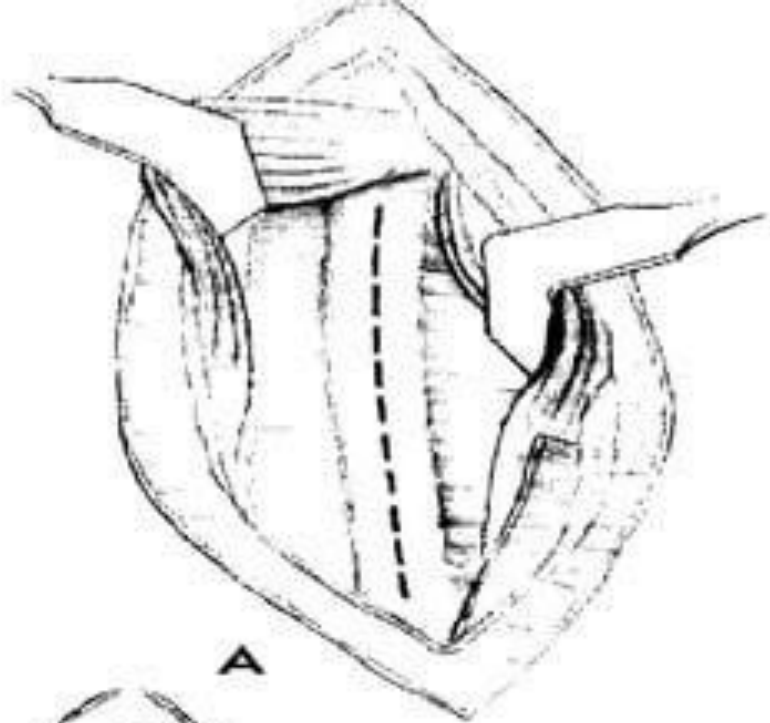


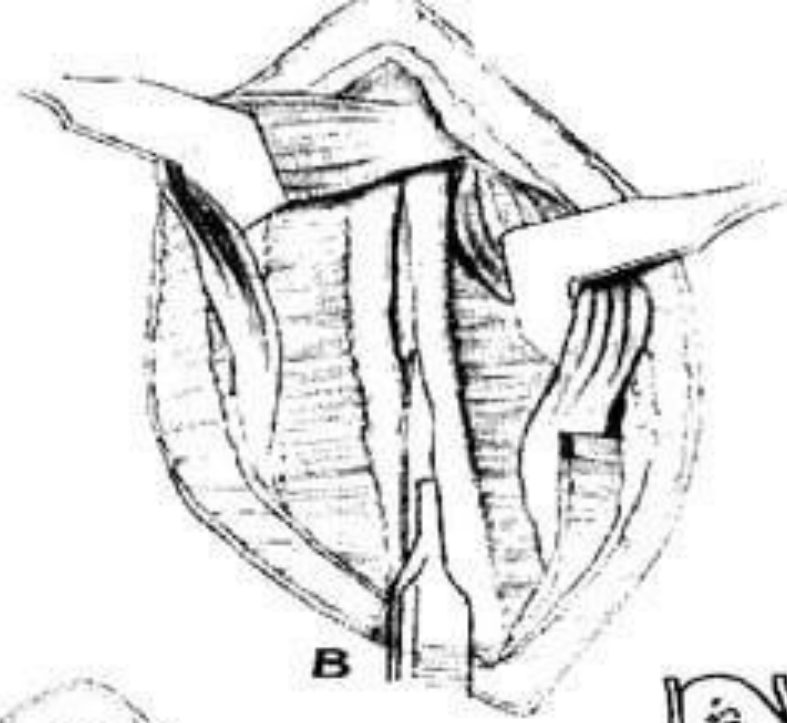
Figure 27-7. Closure of intercostal thoracotomy. *A*, A thoracostomy tube (12 to 20 French) is placed intercostally through the caudodorsal thorax before closure. *B*, Rib closure is accomplished by heavy-gauge interrupted circumcostal sutures passed bluntly through adjacent intercostal spaces to avoid damage to the intercostal vessels. *C*, The preplaced circumcostal sutures are used by an assistant to approximate the ribs while the surgeon ties an adjacent suture. *D*, The serratus ventralis and scalenus muscles are closed in a single layer. The latissimus dorsi muscle, the cutaneous trunci muscle, the subcutaneous tissues, and the skin are closed in separate layers. (From Orton EC: *Small Animal Thoracic Surgery*. Williams & Wilkins, Baltimore, 1995.)

Lateral Rib Resection Thoracotomy

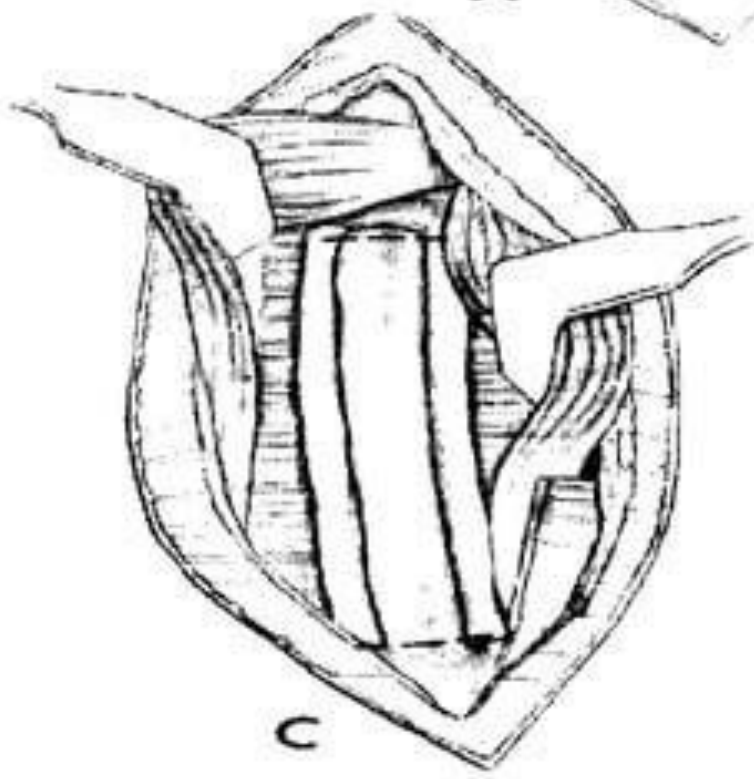
- A wider exposure of the chest (eg : removal of large masses)
- Increased time & less secure closure
- Infrequently used in small animals



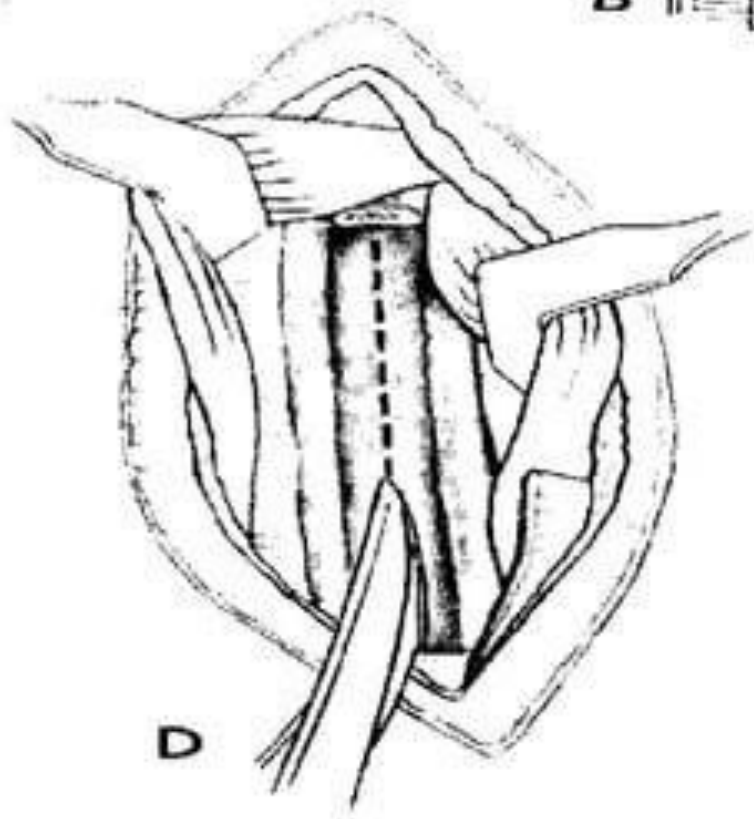
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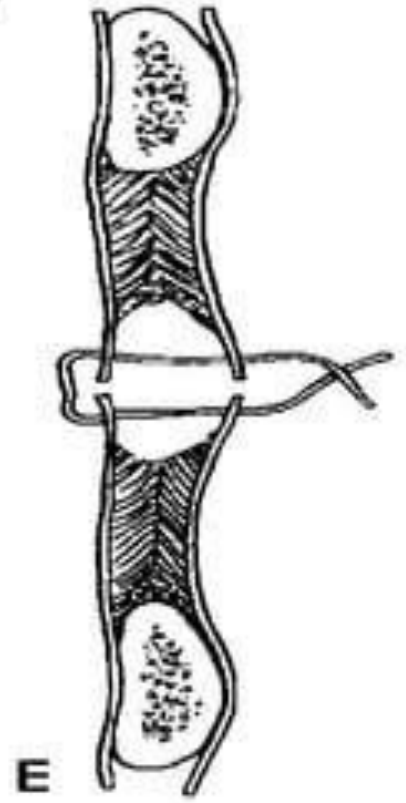
B



C



D



E



1. PECTUS EXCAVATUM

- Inward concave deformation of caudal sternum and costal cartilages
- Retarded growth, dyspnoea, exercise intolerance, vomiting, cyanosis
- Sx indicated if Cardio pulmonary effect is v severe
- Multiple chondrotomy, excision of malformed costal cartilages, sternum struts, external splinting

2. RIB DEFORMITIES

- Missing ribs
- Fused ribs
- Multiple ribs
- Malformed Ribs
- Sx –if restricted ventilation & paradoxical respiration

3. METABOLIC BONE DISEASES

- Primary parathyroidism
- Hypervitaminosis
- Cartilage exostosis
- Tx: According to underlying cause

6. NEOPLASIA

- Skin / sc benign , lipomas
- Osteosarcoma, chondrosarcoma, fibro sarcoma, haemangiosarcoma
- Internal thoracic wall –considered malignant
- Neoplasms of rib – Primary malignant
- Dx- Radiograph – osteolysis, extra thoracic soft tissue masses, mineralization, biopsy
- Tx: Resection. Prognosis poor for osteosarcoma

Traumatic Reticuloenteritis (Hardware Disease)

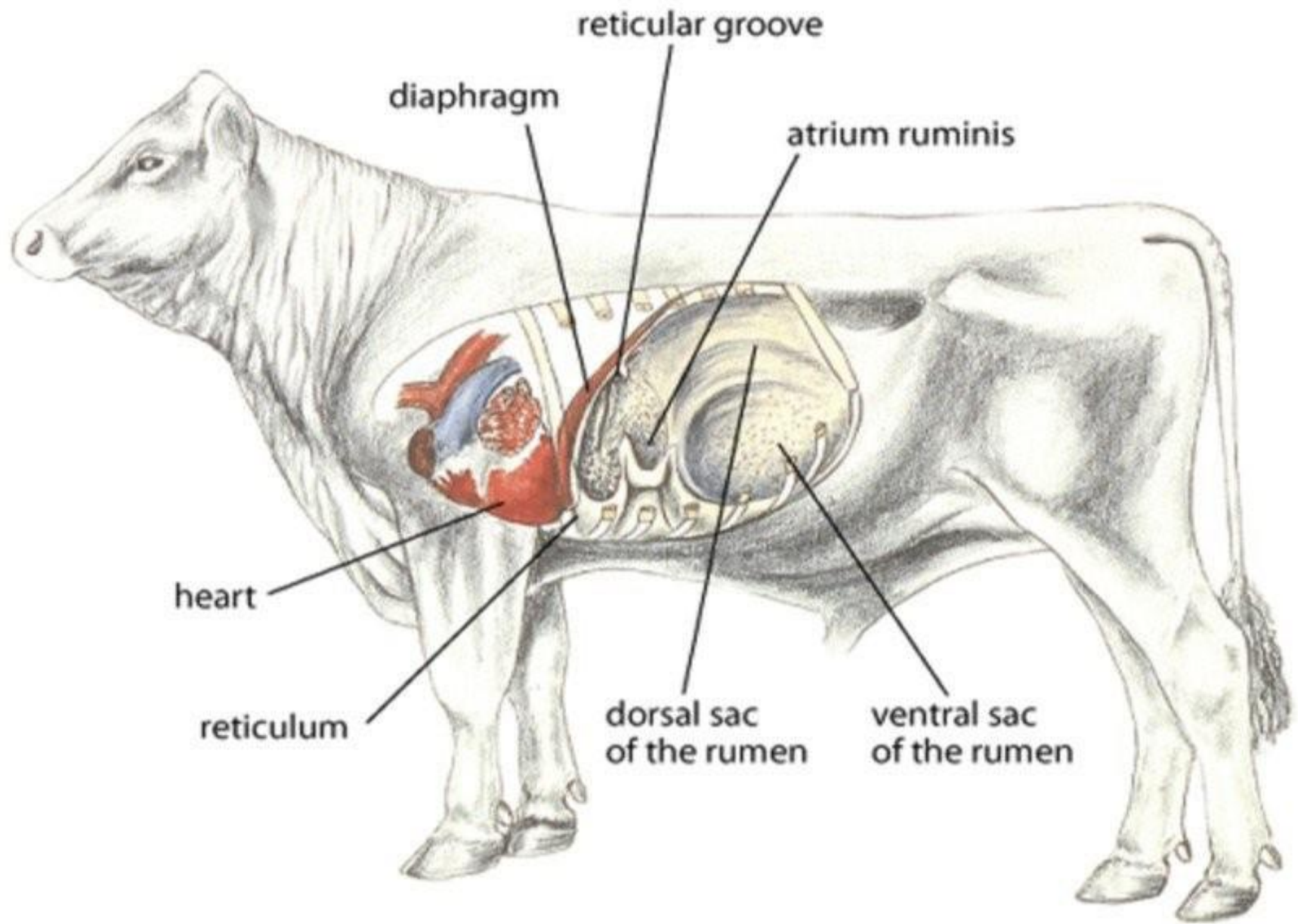
- Consequence of perforation of the reticulum
- Most common in mature dairy cattle, occasionally seen in beef cattle, and rarely reported in other ruminants.

Aetiology:

- Accidental ingestion of foreign body through feed or while grazing in the pasture.
- Lack of oral discrimination in animal
- Incomplete mastication of feed before swallowing.
- Tendency to lick metallic object
- Greedy feeding

Pathogenesis:

- Swallowed metallic objects directly falls into the reticulum or pass into the rumen
- Carried over the rumino-reticular fold into the cranio-ventral part of the reticulum



reticular groove

diaphragm

atrium ruminis

heart

reticulum

dorsal sac
of the rumen

ventral sac
of the rumen

- The elevated reticulo-omasal orifice tends to retain heavy objects in the reticulum, and the honeycomb-like reticular mucosa traps sharp objects.
- Contractions promote the penetration of the wall by the foreign object.
- In late pregnancy uterus give compression on rumino-reticulum wall and straining during parturition increase the likelihood of an initial penetration of the reticulum and may also disrupt adhesions caused by an earlier penetration



Reticulum (Honey Comb)

(Serem et al., Inter J Vet Sci, 2018, 8(2): 73-78)

- Perforation of the wall of the reticulum allows leakage of ingesta and bacteria, which contaminates the peritoneal cavity.
- Initially, peritonitis is generally localized and adhesions takes place
- The object can penetrate the diaphragm and enter the thoracic cavity (causing pleuritis and sometimes pulmonary abscessation) and
- The pericardial sac causing pericarditis and sometimes followed by myocarditis



(Serem et al., Inter J Vet Sci, 2018, 8(2): 73-78)

Clinical Findings:

- Sudden onset of rumino-reticular atony and a sharp fall in milk production
- Mild increased temperature
- HR: Normal or slightly increased
- Respiration: Usually shallow and rapid
- Arched back; anxious expression; a reluctance to move; and an uneasy, careful gait
- A grunt produced by applying pressure to the xiphoid or by



- Placing a stethoscope over the trachea and applying pressure or pinching the withers at the end of an inspiration.
- Tremor of the triceps and abduction of the elbow may be seen.
- Bilateral jugular extension

Chronically:

- The feed intake and fecal output are reduced, and milk production also remain reduced
- As the acute inflammation subsides, there is less abdominal pain and temperature become normal
- Some may develop vagal indigestion due to adhesion on ventromedial reticulum.

IF HEART or LUNG INVOLVED:

- There is depression, tachycardia (>90 bpm), and pyrexia (104°F)—in both pleuritis or pericarditis
- Pleuritis is manifest by fast, shallow respiration
- Muffled lung sounds
- Pleuritic friction rubs

- Thoracentesis gives several liters of septic fluid
- Traumatic pericarditis HAVE muffled heart sounds
- Pericardial friction rubs or gas and fluid splashing sounds (washing machine murmur) can be heard on auscultation at initial episodes
- Jugular vein distention and congestive heart failure with marked submandibular and brisket edema is a frequent sequela of traumatic reticulopericarditis with GRAVE PROGNOSIS.
- Penetration through the pericardium into the myocardium LEAD TO extensive hemorrhage into the pericardial sac or ventricular arrhythmias and sudden death.

Diagnosis:

- History (when available) and clinical findings
- Laboratory tests (neutrophilia with a left shift, ↑Plasma fibrinogen)
- May have marked hypokalemic, hypochloremic metabolic alkalosis
- Peritoneal fluid analysis (d-dimer and the neutrophil percentage)for peritonitis

- Magnetic compass
- Ultrasonography using a 3-MHz transducer is the most accurate way to diagnose localized peritonitis near the reticulum at the ventral abdomen and characterize the reticular contraction frequency
- Lateral radiographs of the cranio-ventral abdomen can detect metallic material in the reticulum
- Electronic metal detector

Treatment:

- Surgical or Medical
- Medical treatment involves:
 - ✓ Use of antimicrobials to control the peritonitis and a magnet to prevent recurrence.
 - ✓ Because of the mixed bacterial flora in the lesion, a broad-spectrum antimicrobial agent such as oxytetracycline (16 mg/kg/day, IV) should be used.

- Penicillin (22,000 IU/kg, IM, once to twice daily) is widely used and effective in many cases despite its limited spectrum.

Surgical Methods:

- Rumenotomy with manual removal of the object(s)
- Antimicrobials peri-operatively

Prevention:

- Avoiding the use of baling wire, passing feed over magnets to remove metallic objects.
- Keeping cattle away from sites of new construction, and completely removing old buildings and fences.
- Additionally, bar magnets may be administered PO, preferably after fasting for 18-24hr .
- Usually, the magnets remains in the reticulum and holds any ferromagnetic objects on its surface.
- To minimizes the incidence of TRP, giving magnets to all herd replacement heifers and bulls at 1 yr of age are recommended



**Thank
You**